Specification Toolbox 2.0

ABB i-bus KNX in Hotel Guest Rooms
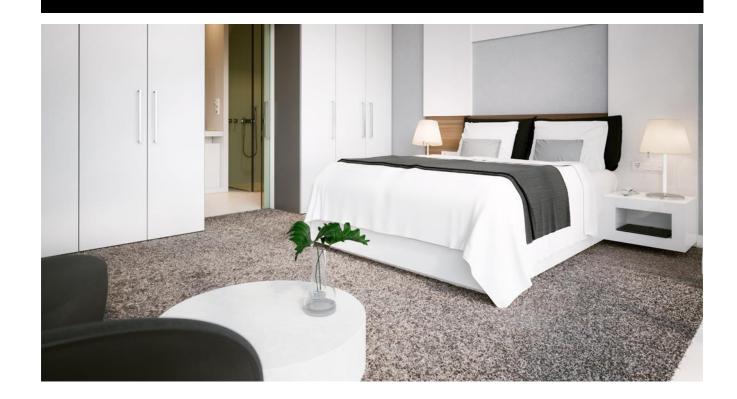# Functional Specification – Basic

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1. General Requirements

- The Intelligent Building Control System shall be designed and developed in accordance with the multi-vendor KNX standard and also in conformity to the following standards:

    - European Standard (CENELEC EN 50090 and CEN EN 13321-1)
    - International Standard (ISO/IEC 14543-3)
    - Chinese Standard (GB/T 20965)
    - US Standard (ANSI/ASHRAE 135)

- Systems which are single vendor based and run on proprietary protocols shall not be accepted. The system shall ensure that devices from different manufacturers are interoperable and compatible thus providing a future proof and flexible installation.

- The system should cover the requirements for hotel guest room management control.

- The system shall be completely decentralized and programmable. Each device will have its own intelligence. The parameters are configured using PC or notebook computer located anywhere in the system topology. Systems using centralized controllers or processors will not be accepted. In case of power failure all the configuration and status information have to be stored and retained in a non-volatile storage. This data shall be pushed back to the device once electrical current is back. System with additional built-in or external battery that needs to be changed periodically for information storage shall not be accepted.

- The communication cable that links all the devices shall have data and power residing on the same medium. It shall also be possible to lay the cable along the power mains. Systems requiring different communication cables for signal transmission and control power between the devices are not acceptable.

- The bus connection terminal of all the devices should have 4 bus connection possibilities for looping or branching of bus cable. The bus cable shall be laid in the building in all possible configurations, i.e. linear, star or tree architecture similar to the power mains. Systems requiring fixed wiring configurations shall not be acceptable. It is thereby possible to disconnect the devices without interrupting the bus line. Systems requiring special tools for crimping, lagging or special installation connectors, e.g. RJ45 bus connections, shall not be acceptable.

- Online programming of any device of the system should be possible without affecting the other devices on the system as well as offline programming prior to dispatching of the material to site. In the event of failure of a device in one line, only the control functions controlled by that device shall be affected and all other devices shall continue to operate normally.

- Each device shall operate via the 21…30 V DC made available on the KNX bus line. The power supply unit should deliver a 640 mA/320 mA/160 mA version depending upon the bus network density.

- The system shall communicate through CSMA/CA with parity checks in order to avoid collision in the bus thereby increasing the system flexibility and bandwidth allocation. Systems which work on polling or master-slave configurations shall not be accepted.

1.1. System Description

– The Guest Room Management System (GRMS) shall be programmed to provide lighting, air-conditioning and courtesy controls for the individual guest room with the possibility of future upgrades.

– The system shall include, but shall not be limited to, the following for each guest room:

  – Room control device and system components
  – Guest room enclosure
  – Outside courtesy indicator panel
  – Energy saver card holder
  – Room thermostat
  – Door contact
  – Momentary push switches
  – Room call system in rooms for disabled guests (optional)
  – Centralized monitoring/control and interfaces

1.2. System Components and Room Controller Devices

– Dedicated integrated controller shall be provided in individual rooms for controlling lighting (switching), HVAC, as described in chapter 3. The controllers shall have decentralized intelligence and shall be independent of any centralized controllers/software. For each application, such as HVAC/lighting control, dedicated controllers or channels needs to be used. Systems and/or room controllers relying on non-specialized universal relays and 0…10 V outputs for common control of the latter applications shall not be accepted.

1.3. Guest Room Enclosure

– There shall be a dedicated guest room enclosure for the guest rooms, which shall be located next to the DB, as per the site installation requirements. The enclosures shall feature built-in DIN rails for easy installation and access for maintenance. Each guest room shall have one enclosure to house the guest room controller devices for that particular room depending on the number of control points.

1.4. Push Switches

– Push switches shall be used to control lights, and they shall be supplied as a part of wiring accessories.
The wiring accessories, e.g. sockets, data outlets, switches, shall be from the same supplier as the Guest Room Management system to ensure uniformity in the finishes inside the room. These switches shall be connected directly to the appropriate loads. For superordinated funtioncs (e.g. Master switch), momentary push switches shall be used which are interface via binary inputs to the room controller. Switches shall be appropriately designed and located wherever necessary. All outlets, switches and faceplates shall be in accordance with the interior designer's selected finishes.

2. Requirements of Guest Room – Basic Configuration

2.1. Corridor and entrance

2.1.1. Corridor

– Outside courtesy indicator panel: The outside courtesy indicator panel shall have Do not Disturb (DnD) & Make up Room (MuR) indicator with bell push switch. The DnD & MuR indicator shall be activated from the DnD/MuR switch in the hotel room.

– Access reader based on RFID technology

– Wall-mounted LED light indicating the room number

2.1.2. Entrance

– Energy saver card holder in each room located near the guest room entrance for energy efficiency. Insertion of access card into the unit shall activate a "Welcome mode" as detailed in **Fehler! Verweisquelle konnte nicht gefunden werden.**. The guest shall then have the option of overriding the lighting circuits manually via the push switches. When removing the key card from the holder an "Exit mode" has to be called. The device shall be installed in standard boxes. Devices requiring non-standard back boxes shall not be accpeted.

– 2-fold switch to control the vestibule and main room light as defined by the hotel operator.

– 2-fold switch to control Do not Disturb (DnD) & Make up Room (MuR) status. The switch shall be interfaced to the KNX bus system via binary inputs of room master controller.

– 230 V power outlet for general purposes, switchable via room master controller

– Door contact: Magnetic reed contacts shall be provided for each guest room and interfaced to the KNX bus via binary inputs of a room controller. If the guest room door is opened longer than 5 minutes, for example, an alarm shall be sent to the central Building Managemen System (BMS).

2.2. Sleeping, Living and Study

2.2.1. Sleeping

- Bedside right:
    - 2-fold switch to control right bedside reading light and main ceiling light
    - 1-fold switch as (sub-)master switch controlling the lighting of the entire hotel room, interfaced to KNX bus system via binary inputs of room controller
    - 230 V power outlet, e.g. for loading mobile devices, shall not be switched off when the guest leaves the room. The socket shall be equipped with an integrated USB interface in the socket frame.
    - Telephone outlet for bedside telephone (cat. 3 data outlet) (optional)

- Bedside left:
    - 2-fold switch to control left bedside reading light and main ceiling light
    - 1-fold switch as (sub-)master switch controlling the lighting of the entire hotel room, interfaced to KNX bus system via binary inputs of room controller
    - 230 V power outlet, e.g. for loading mobile devices, shall not be switched off when the guest leaves the room. The socket shall be equipped with an integrated USB interface in the socket frame.
    - Telephone outlet for bedside telephone (cat. 3 data outlet) (optional)

2.2.2. Living and Study

- Room temperature control unit

- Sockets and media connection terminals:
    - 2 x 230 V socket outlet above desk
    - 230 V socket outlet for the connection of electric iron
    - 230 V socket outlet for the connection of electric kettle
    - 2 x 230 V socket outlet for general purpose
    - 2 x 230 V socket outlet for TV
    - 230 V socket outlet for minibar
    - Data outlet (cat. 6 data outlet)
    - USB charging outlet for loading mobile devices with 2 USB interfaces

- Window contact (optional): Magnetic reed contact shall be provided for each guest room and interfaced to the room controller. If balcony door/window is openend (if applicable), the Fan Coil Unit shall be forced to switch to standby operation mode.

- Room call system for disabled guests (optional): For handicapped rooms, emergency call system shall be provided and integrated to the room master controller. The connection to the bus system is established via the room controller. Emergency push-buttons shall be provided in the toilets and next to the bedside. In case of an emergency call, alarms shall be reported to the central Building Management System (BMS).

2.3. Bathroom

– Switches:

  – 2-fold switch for ceiling light and mirror/make-up mirror light

– Sockets:

  – 230 V socket outlet above washstand
  – 230 V/110 V socket outlet for power/shaver
  – 230 V power supply for hair dryer
  – 230 V power supply for general purpose

– Blower: The blower is switched on in combination with the ceiling lighting in the bathroom. After switching of the ceiling light the blower will be switched off with a delay of 5 minutes, for example.

– Under floor heating and/or heated towel bar depending on local climatic conditions (optional). The heating is controlled by the RTC unit; there must be no further guest interaction. The heating is connected to electricity or to the central water heating system. If the bathroom heating system is connected to the central water heating system a KNX electromotor valve drive can be used for opening and closing the valve, dependent on the required room temperature.

– Audio speaker connected to a digital radio, which can be operated and controlled in the bathroom

2.4. Room scenarios and others

– Welcome mode:

  – The insertion of the guest key card in the appropriate holder activates a predefined "Welcome mode".
    The guest shall then have the option to override the lighting circuits manually via the push switches.
    The welcome mode may include (depending on the needs of the operator):

      – Certain lights shall be switched on and non-essential power sockets energized.
      – RTC unit shall switch to comfort mode (fast cool/fast heat mode) and a specific set point temperature (e.g. 22 °C).

– Exit mode:

  – When the guest leaves the room, the room is set in an energy saving state. This is triggered by removing the key card from the appropriate key card holder or by the occupancy sensor in combination with the door contact.
    The exit mode may include (depending on the needs of the operator):

      – All lights shall be switched off and non-essential power sockets de-energized.
      – Room thermostat shall switch to standby mode (hotel preset), e.g. 26 °C in cooling mode or 18 °C in heating mode.

2.4.1. Access control system

  – The access control system for the guest room shall be part of security and not an integral part of the guest room management system.

2.4.2. Switchable socket outlets

  – All sockets shall be switchable. For technical reasons or for guest comfort, some socket outlets are permanently on and do not have to be switchable (as per individual requirements):

      – Minibar
      – Desk sockets
      – Bedside table sockets
      – Cleaning socket
      – Bathroom socket outlets

3. Control Devices

3.1. Power Supply with Enhanced Diagnostics (320 mA/640 mA)

− Produces and monitors the KNX system voltage

− With diagnostic function via KNX or ABB i-bus® Tool

− The voltage output is short-circuit- and overload-proof. The LEDs indicate the bus current consumption and the status of the line or device.

− Diagnostic functions via KNX: Bus voltage U_N, bus current I, bus current I > rated current I_N, overload I > I_{max}, trigger bus reset

− Supply voltage: U_S 85…265 V AC, 50/60 Hz

− KNX voltage output: 1 line with integrated choke

   − Rated voltage: U_N 30 V DC +1/-2 V, SELV

− Power consumption:

   − < 30 W (320 mA)
   − < 55 W (640 mA)

− Nominal power loss:

   − < 2.5 W (320 mA)
   − < 4 W (640 mA)

− Output voltage: 30 V DC +1/-2 V, SELV

− Nominal current: 320 mA/640 mA, short-circuit-proof

− Sustained short-circuit current:

   − < 0.8 A (320 mA)
   − < 1.4 A (640 mA)

− Mains failure back-up time: 200 ms

− Rated current: I_N 320 mA or 640 mA

− Connection:

   − Bus connection: Bus connection terminal
   − Supply connection: Screw terminals

− Type of protection: IP 20, IEC/EN 60 529

− Mounting: 35 mm mounting rail, IEC/EN 60 715

− Width: 4 modules at 18 mm

− Manufacturer: ABB

− Product type (dependent on current): SV/S 30.320.2.1, SV/S 30.640.5.1

3.2. Room Master Controller

– The Room Controller is a specially adapted device for use in hotel rooms, apartments, patients rooms in hospitals, homes for senior citizens and students.
The device controls up to 3 fan speeds via a stage switch or two-way connection. The fan speeds are mutually exclusive.
2 electronic outputs control the actuator and thermal valves. Both, 2-point or 3-point valves, for a heating and cooling circuit can be connected with a voltage of 24…230 V. The electronic outputs are protected against short-circuit.
3 further floating contacts are available, which, for example, can control the sockets, the lighting and additional electrical heating in the room.
Furthermore, 8 floating binary inputs are available for contact scanning. To these, for example, you can connect an emergency call contact, the on/off button for the auxiliary electrical heating, a water sensor, a master switch, a door contact, a card reader, a window contact and condensation water monitoring. The device is supplied with power via KNX bus.

– Standalone operation without KNX bus. It is possible to operate the device by applying an auxiliary voltage (separate KNX device) to the bus terminal.

– Fan speed: 3-fold, mutually interlocked

– Rated current: 6 A, AC3

– Switch contact: 1-fold

– Rated current: 20 A (16 A C-Load, AC3)

– Switch contact: 2-fold

– Rated current: 16 A (10 AX)

– Binary input: 8-fold, contact scan

– Scan current/voltage: 0.1 mA/32 V

– Valve outputs: 2 O/Ps, short-circuit-proof

– Voltage: 24…230 V
– Current: 0.5 A, per output

– Operation: 3 switch levers for switch position indication and manual operation

– Connection:

– Screw terminals
– KNX: Screwless bus connection terminals

– Type of protection: IP 20, IEC/EN 60 529

– Mounting: 35 mm mounting rail, IEC/EN 60715

– Width: 8 modules at 18 mm

– Manufacturer: ABB

– Product type: RM/S 1.1

3.1. Room Thermostat Fan Coil with Display

− KNX fan coil room temperature controller with display

− Surface-mounted with integrated KNX bus coupler

− LCD and 5 operating buttons

− Used for single-room temperature control in heating and air-conditioning technology

− The controller is a constant ambient temperature controller for fan convectors (fan coils) in 2-pipe and 4-pipe systems and conventional heating or cooling systems.

− Adjusting range: 10…28 °C

− The ambient temperature controller works in both heating and cooling mode.

− The fan stage can also be selected manually via a button:
    − OFF/Stage
    − 1/Stage
    − 2/Stage
    − 3/Automatic

− Functions:
    − Comfort, standby, night, frost protection, and heat protection modes
    − Actuation of fan convectors (fan coil) in two-pipe and four-pipe systems
    − Actuation of two-point, PWN, or constantly regulated heating and cooling systems

− Control and display elements:
    − One LCD for displaying temperatures, operating modes, fan stages, and fault messages
    − One push-button for manually turning the device on and off
    − One push-button for the selection of the fan stage:
        − OFF/Stage
        − 1/Stage
        − 2/Stage
        − 3/Automatic
    − One push-button for increasing the set temperature
    − One push-button for reducing the set temperature
    − One push-button for switching the temperature unit between Celsius and Fahrenheit

− Connections:
    − KNX line: DP screw/clamp terminals

− Inputs:
    − Measuring range: Temperature: 0 °C to 50 °C

− Type of protection: IP 20, IEC/EN 60 529

− Temperature range: -5 °C to 45 °C

− Mounting: Surface-mounting directly onto the wall and all common flush-mounted socket outlets

− Dimensions (H x W x D): 81 mm x 81 mm x 20 mm

− Manufacturer: ABB

− Product type: 6138/11

3.2. Card Switch

− For switching electrical consumers

− SP, with normally open contact (operating current)

− Illuminable

− With N terminal

− Rated voltage: 250 V DC

− Rated current: 10 A

− Manufacturer: ABB

− Product type: 2025 U (insert) & 1792 (cover plate)

3.3. "DND/MUR" Switch

− For flush-mounted switch 2g 1w, 2g push switch

− Marked: "DO NOT DISTURB" & "MAKE UP ROOM"

− Manufacturer: ABB

− Product type: 2000/5 USGL (insert) & 1785/11 (cover plate)

3.4. Busch-Digital Radio

- Standalone RDS stereo FM radio with display for flush-mounted installation

- Reception frequency: 87.50…108.00 MHz

- With external input for iPod or iPhone docking station

- For mono/stereo operation

- 8 radio stations storable

- With time display

- With alarm function

- With automatic switch-off function (automatic sleep mode)

- With extension input to remote-controlled ON/OFF switches

- With integrated antenna

- With additional connection for external antenna

- Permitted speaker impedance: 4…8 Ohm

- Can be installed as 1-fold and in multiple combinations

- Rated voltage: - 230 V DC, ±10 %

- Rated frequency: 50…60 Hz

- Type of protection: IP 20, IEC/EN 60 529

- Temperature range: 5 °C to 40 °C

- Manufacturer: ABB

- Product type: 8215 U-500 (insert) & 8252-XY (cover plate)

3.5. Loudspeaker Insert

- For flush-mounted radio insert

- For flush-mounted Internet radio insert

- With broadband characteristics

- With flat plug connector

- Including speaker connection cable

- Rated output: 2 W (RMS)

- Frequency response: 200…20,000 Hz

- Impedance: 4 Ohm

- Manufacturer: ABB

- Product type: 8223 U-500 (insert) & 8253 (cover plate)

3.6. USB Charging Station Insert

− For charging and supplying mobile terminal devices via USB cables

− With micro USB connecting cable

− Connecting cable joined captive to insert

− Usable cable length (including micro USB plug) approx. 22 cm

− With electronic short-circuit protection

− With electronic overload protection

− Manufacturer: ABB

− Product type: 6474 U-500 (insert) & 6478 (cover plate)

3.7. Data-Connection Box, RJ 45, Cat. 6a ISO

− With down-leading outlet and LSA self-cutting clamps

− RJ-45 terminals for networks according to Cat 6A, Class EA (10 Gbits/s/500MHz)

− Equates to Cat. 6a, Class EA according to ISO/IEC 11801:2011-06

− Terminal marking A and B according to TIA/EIA-568-B.2

− Typ according to IEC/EN 60 603-7-51:2011-01

− Shielding according to DIN EN 55 022, Class B

− Up to 500 MHz on all pairs of wires

− Suitable for 10-Gigabit Ethernet

− Suitable for PoE+ according to IEEE 802.3at ≥ 1, 000 contact durability

− Flex cable entries from all sides without buckles

− Earthing of housing via 6.3 mm blade terminal at the back possible

− Re-embedded proofed

− Suitable for Mix-and-Match operation

− Suitable for RJ 11, RJ 12 and RJ 45

− For data cables with a diameter of 6…10 mm

− For wires of AWG 24-22

− For trunk systems, flush-mounted wall boxes and underfloor systems

− Manufacturer: ABB

− Product type: 0218/11-101 (insert) & 1803 (cover plate)

3.8. SCHUKO® USB Socket Outlet

− For connecting electrical consumers

− With screwless terminal

− 2-pole (2 P + E)

− For charging and supplying mobile terminal devices via USB cables

− With USB female connector type A

− With electronic short-circuit protection

− With electronic overload protection

− Simultaneous charging via USB connection and use of the SCHUKO® socket outlet

− Rated voltage: 250 V D

− Secondary: 5 V-, ±5 %

− Rated frequency: 50 Hz

− Power dissipation: 0.1 W

− Manufacturer: ABB

− Product type: 20 EUCBUSB

3.9. Shaver Socket Outlet

− Rated voltage: 240 V, ±10 %

− Output voltage: 115 V, ±10 %

− Secondary: 240 V, ±10 %

− Rated frequency: 50…60 Hz

− Rated power: 20 VA

− Manufacturer: ABB

− Product type: 2332 UJBS (shaver socket) & 3031 (Flush-mounting wall box)

Further information and local contacts:

www.abb.com/knx

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